

REMARKS

Claims 1-19 remain pending in the present application. Claim 1 has been amended. Claims 11-19 are new. Basis for the amendments and new claims can be found throughout the specification, claims and drawings originally filed.

In the Office Action, the Examiner indicated that Claims 1-9 were pending and only Claims 1-9 were addressed in the Office Action. The original application was filed with Claims 1-10. Applicants believe Claim 10 would have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims by the Examiner since Claim 10 depends from Claim 9.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hebert. Applicants respectfully traverse this rejection. Claim 1 has been amended to include the limitation "said variable throttle valve is actuated in response to a level of subcooling of a refrigerant detected at an outlet of said high pressure refrigerant of said refrigerant-to-refrigerant heat exchanger in a manner that".

Hebert seems to disclose a refrigeration cycle including a refrigerant-to-refrigerant heat exchanger 10, an evaporator 30, a thermostatic expansion valve 26, a compressor 36, a condenser 20, and a temperature sensor 28. The expansion valve 26 is disposed downstream of a high-pressure side of the heat exchanger 10 and upstream of the evaporator 30. The sensor 28 is disposed downstream of a low pressure side of the heat exchanger 10 and upstream of the compressor 36. The temperature sensor 28

therefore detects a temperature of a refrigerant flowing out of the low pressure side of the heat exchanger 10. The expansion valve 26 operates based on a signal generated by the temperature sensor 28. See Fig. 3.

To the contrary, amended Claim 1 of the present invention defines a variable throttle valve 6 (an expansion valve) that operates based on a temperature of a refrigerant flowing out of a high pressure side of a refrigerant-to-refrigerant heat exchanger 5. The subcooling of the refrigerant flowing out of the high-pressure side of the heat exchanger 5 toward the throttle valve 6 is detected. This is the temperature of the refrigerant downstream of the high-pressure side of the heat exchanger 5. Furthermore, the throttle valve 6 of the present invention includes a deformable diaphragm, wherein an aperture dimension or opening degree of the diaphragm decreases upon an increase in the amount of subcooling.

The present invention simplifies the structure of the entire system because the diaphragm detects a subcooling state of the liquid refrigerant flowing thereto. This distinguishes the present invention from that disclosed by Hebert because the device disclosed by Hebert includes a temperature sensor located downstream of the low pressure side of the heat exchanger. Therefore, the distance between the expansion valve and the sensor disclosed in Hebert is long. Moreover, a capillary portion that connects the expansion valve to the temperature sensor is long. As a result, the expansion valve requires larger components and complicates the structure of the refrigeration cycle.

Thus, Applicants believe Claim 1, as amended, patentably distinguishes over the art of record. Likewise, Claims 2-7, which ultimately depend from Claim 1, are also

believed to patentably distinguish over the art of record. Reconsideration of the rejection is respectfully requested.

ALLOWABLE SUBJECT MATTER

Claims 8-10 are believed to be objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 8-10 ultimately depend from Claim 1 and are thus still believed to be allowable.

NEW CLAIMS

New Claims 11 and 12 are dependent claims which ultimately depend from Claim 1 and are thus believed to be allowable.

New Claim 13 is a combination of original Claims 1 and 8. Claim 8 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Thus, Claim 13 is believed to be allowable.

New Claims 14-19 are a claim set which is directed to the refrigeration cycle component of the present invention and are thus believed to be allowable.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is

believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By: 

Michael J. Schmidt, 34,007

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

MJS/pmg